Table 1. Species-specific length at maturity, asymptotic length (Loo; average maximum size), and DAR size limit (where applicable).

Kaʻūpūlehu Species

| Hawaiian Name | Common Name | Scientific Name | Length at maturity (in) | Mean asymptotic length (Loo; in) | DAR minimum size limit (in) |
|---|---|---|---|---|---|
| Pualu | Ringtail Surgeonfish | Acanthurus blochii*** | 10 | 13 | |
| Palani | Eyestriped Surgeonfish | Acanthurus dussumieri*** | 11 | 15 | |
| Manini | Convict Tang | Acanthurus triostegus sandvicensis*** | 6 | 7 | 5 |
| Pualu | Yellowfin Surgeonfish | Acanthurus xanthopterus | 17 | 20 | |
| Kole | Goldring Surgeonfish | Ctenochaetus strigosus*** | 3 | 7 | |
| Kala Lolo | Paletail Unicornfish | Naso brevirostris | 11 | 13 | 14 |
| ʻŌpelu kala | Sleek Unicornfish | Naso hexacanthus | 20 | 24 | 16 |
| Umauma lei | Orangespine Unicornfish | Naso lituratus*** | 8 | 10 | |
| Kala | Bluespine Unicornfish | Naso unicornis*** | 14 | 19 | 14 |
| ʻŌ'io | Shortjaw Bonefish | Albula glossodonta | 17 | 26 | 14 |
| ʻŌ'io | Longjaw Bonefish | Albula virgata | 17 | 22 | |
| Ulua aukea | Giant Trevally | Caranx ignobilis*** | 29 | 77 | 10 |
| Ulua lāʻuli | Black Trevally | Caranx lugubris | 15 | 32 | 10 |

| Hawaiian Name | Common Name | Scientific Name | Length at maturity (in) | Mean asymptotic length (Loo; in) | DAR minimum size limit (in) |
|---|---|---|---|---|---|
| ʻŌmilu | Bluefin Trevally | Caranx melampygus | 18 | 40 | 10 |
| Pake ulua | Bigeye Trevally | Caranx sexfasciatus | 18 | 31 | 10 |
| Kamanu | Rainbow Runner | Elagatis bipinnulata | 25 | 37 | |
| Butaguchi | Thick Lipped Jack | Pseudocaranx dentex | 10 | 49 | |
| Kahala | Greater Amberjack | Seriola dumerili | 31 | 44 | |
| ʻŪʻū | Bigscale Soldierfish | Myripristis berndti | 6 | 10 | |
| Uku | Green Jobfish | Aprion virescens | 18 | 30 | |
| Ta'ape | Bluestipe Snapper | Lutjanus kasmira | 8 | 13 | |
| Ama'ama | Striped Mullet | Mugil cephalus | 12 | 22 | 11 |
| Wekeʻā | Yellowstripe Goatfish | Mulloidichthys flavolineatus*** | 7 | 13 | 7 |
| Weke 'ula | Yellowfin Goatfish | Mulloidichthys vanicolensis | 7 | 9 | |
| Moano | Manybar Goatfish | Parupeneus multifasciatus*** | 6 | 12 | 7 |
| Kūmū | Whitesaddle Goatfish | Parupeneus porphyreus | 9 | 19 | 10 |
| Uhu-uliuli | Spectacled Parrotfish | Chlorurus perspicillatus | 14 | 21 | 12 |

| Hawaiian Name | Common Name | Scientific Name | Length at maturity (in) | Mean asymptotic length (Loo; in) | DAR minimum size limit (in) |
|---|---|---|---|---|---|
| Uhu | Bullethead Parrotfish | Chlorurus sordidus | 7 | 12 | |
| Uhu | Pacific Daisy Parrotfish | Chlorurus spilurus | 7 | 14 | 12 |
| Uhu | Palenose Parrotfish | Scarus psittacus | 5 | 13 | 12 |
| Uhu pālukaluka | Redlip Parrotfish | Scarus rubroviolaceus*** | 14 | 21 | 12 |
| Roi | Peacock Grouper | Cephalopholis argus | 11 | 20 | |
| Kākū | Great Barracuda | Sphyraena barracuda | 31 | 49 | |

Table 2. Species-specific minimum size limits that achieve a sustainability reference point (i.e., spawning potential ratio of 30%) at (L) low, (M) medium, and (H) high fishing pressure. Final column on the right shows high fishing pressure size limit option as a multiplier of Lm, thus enabling direct comparison across species.

| | | | Minimum size limit achieving SPR 30% | | | Relative yield achieved | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Length at maturity (Lm) | | Fishing pressure (F/M) | | | Fishing pressure (F/M) | | | | | Lm option |
| Species | in | mm | L | M | H | L | M | H | M/K | Lm/Loo | F/M = H |
| Acanthurus blochii | 10.12 | 257 | 231 | 283 | 308 | 0.67 | 0.81 | 0.89 | 0.37 | 0.76 | 1.2 x Lm |
| Acanthurus dussumieri | 11.10 | 282 | 254 | 310 | 338 | 0.70 | 0.85 | 0.91 | 0.39 | 0.76 | 1.2 x Lm |
| Acanthurus triostegus sandvicensis | 6.14 | 156 | 140 | 156 | 156 | 0.56 | 0.67 | 0.95 | 0.68 | 0.88 | 1 x Lm |
| Acanthurus xanthopterus | 16.97 | 431 | 388 | 431 | 474 | 0.70 | 0.85 | 0.87 | 0.33 | 0.86 | 1.1 x Lm |
| Ctenochaetus strigosus | 3.31 | 84 | 76 | 126 | 168 | 0.55 | 0.74 | 0.87 | 0.20 | 0.47 | 2 x Lm |
| Ctenochaetus strigosus - female | 3.31 | 84 | 76 | 84 | 101 | 0.49 | 0.64 | 0.97 | 0.27 | 0.73 | 1.2 x Lm |
| Ctenochaetus strigosus - male | 3.94 | 100 | 90 | 110 | 120 | 0.53 | 0.69 | 0.93 | 0.35 | 0.69 | 1.2 x Lm |
| Naso brevirostris | 10.59 | 269 | 242 | 269 | 296 | 0.68 | 0.86 | 1.00 | 0.32 | 0.82 | 1.1 x Lm |
| Naso hexacanthus | 20.12 | 511 | 460 | 511 | 562 | 0.71 | 0.84 | 0.83 | 0.33 | 0.85 | 1.1 x Lm |
| Naso lituratus | 7.83 | 199 | 179 | 199 | 219 | 0.64 | 0.81 | 1.00 | 0.38 | 0.78 | 1.1 x Lm |
| Naso unicornis - male | 11.85 | 301 | 271 | 361 | 452 | 0.66 | 0.85 | 0.88 | 0.14 | 0.63 | 1.5 x Lm |
| Naso unicornis - female | 13.98 | 355 | 320 | 391 | 426 | 0.67 | 0.86 | 0.99 | 0.15 | 0.74 | 1.2 x Lm |
| Albula glossodonta | 16.69 | 424 | 382 | 466 | 509 | 0.79 | 0.90 | 0.97 | 1.28 | 0.63 | 1.2 x Lm |
| Albula virgata | 17.01 | 432 | 389 | 475 | 475 | 0.72 | 0.67 | 0.84 | 1.13 | 0.77 | 1.1 x Lm |

| | | | Minimum size limit achieving SPR 30% | | | Relative yield achieved | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Length at maturity (Lm) | | Fishing pressure (F/M) | | | Fishing pressure (F/M) | | | | | Lm option |
| Species | in | mm | L | M | H | L | M | H | M/K | Lm/Loo | F/M = H |
| Caranx ignobilis | 29.13 | 740 | 740 | 962 | 1110 | 0.83 | 0.92 | 0.95 | 2.64 | 0.38 | 1.5 x Lm |
| Caranx lugubris | 14.57 | 370 | 370 | 444 | 481 | 0.81 | 0.91 | 1.00 | 2.24 | 0.45 | 1.3 x Lm |
| Caranx melampygus | 17.80 | 452 | 452 | 542 | 678 | 0.80 | 0.91 | 0.90 | 1.97 | 0.45 | 1.5 x Lm |
| Caranx sexfasciatus | 17.91 | 455 | 410 | 546 | 592 | 0.77 | 0.89 | 0.95 | 1.22 | 0.57 | 1.3 x Lm |
| Elagatis bipinnulata | 25.20 | 640 | 576 | 704 | 768 | 0.77 | 0.82 | 0.80 | 1.16 | 0.69 | 1.2 x Lm |
| Pseudocaranx dentex | 10.24 | 260 | 520 | | | 0.78 | | | 1.50 | 0.21 | Other |
| Seriola dumerili | 31.46 | 799 | 719 | 879 | 959 | 0.77 | 0.82 | 0.80 | 0.94 | 0.71 | 1.2 x Lm |
| Myripristis berndti | 6.34 | 161 | 145 | 177 | 193 | 0.66 | 0.80 | 0.96 | 0.81 | 0.65 | 1.2 x Lm |
| Aprion virescens | 17.72 | 450 | 405 | 540 | 585 | 0.74 | 0.90 | 1.00 | 0.74 | 0.59 | 1.3 x Lm |
| Lutjanus kasmira | 7.64 | 194 | 175 | 213 | 233 | 0.70 | 0.83 | 0.96 | 1.39 | 0.59 | 1.2 x Lm |
| Mugil cephalus | 11.65 | 296 | 266 | 385 | 444 | 0.71 | 0.89 | 0.98 | 0.83 | 0.53 | 1.5 x Lm |
| Mulloidichthys flavolineatus | 7.20 | 183 | 165 | 220 | 274 | 0.68 | 0.85 | 1.00 | 0.95 | 0.54 | 1.5 x Lm |
| Mulloidichthys vanicolensis | 6.89 | 175 | 158 | 175 | 193 | 0.69 | 0.87 | 1.00 | 0.50 | 0.77 | 1.1 x Lm |
| Parupeneus multifasciatus | 5.71 | 145 | 130 | 218 | 218 | 0.62 | 0.82 | 0.95 | 0.85 | 0.48 | 1.5 x Lm |
| Parupeneus porphyreus | 9.37 | 238 | 214 | 309 | 357 | 0.68 | 0.87 | 0.98 | 1.00 | 0.48 | 1.5 x Lm |

| | Length at maturity (Lm) | | Minimum size limit achieving SPR 30% | | | Relative yield achieved | | | | | Lm option |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Fishing pressure (F/M) | | | Fishing pressure (F/M) | | | | | |
| **Species** | **in** | **mm** | **L** | **M** | **H** | **L** | **M** | **H** | **M/K** | **Lm/Loo** | **F/M = H** |
| Chlorurus perspicillatus | 13.78 | 350 | 315 | 385 | 420 | 0.73 | 0.88 | 1.00 | 0.72 | 0.66 | 1.2 x Lm |
| Chlorurus sordidus | 6.69 | 170 | 153 | 204 | 221 | 0.68 | 0.86 | 1.00 | 0.73 | 0.58 | 1.3 x Lm |
| Chlorurus spilurus | 6.77 | 172 | 155 | 224 | 258 | 0.68 | 0.87 | 1.00 | 0.73 | 0.50 | 1.5 x Lm |
| Scarus psittacus | 5.47 | 139 | 139 | 208 | 278 | 0.64 | 0.83 | 0.83 | 1.10 | 0.43 | 2 x Lm |
| Scarus rubroviolaceus | 13.78 | 350 | 315 | 420 | 455 | 0.70 | 0.88 | 1.00 | 0.39 | 0.65 | 1.3 x Lm |
| Cephalopholis argus | 10.55 | 268 | 241 | 322 | 348 | 0.76 | 0.85 | 0.94 | 1.72 | 0.53 | 1.3 x Lm |
| Sphyraena barracuda | 30.71 | 780 | 702 | 936 | 1014 | 0.77 | 0.91 | 0.98 | 0.65 | 0.63 | 1.3 x Lm |

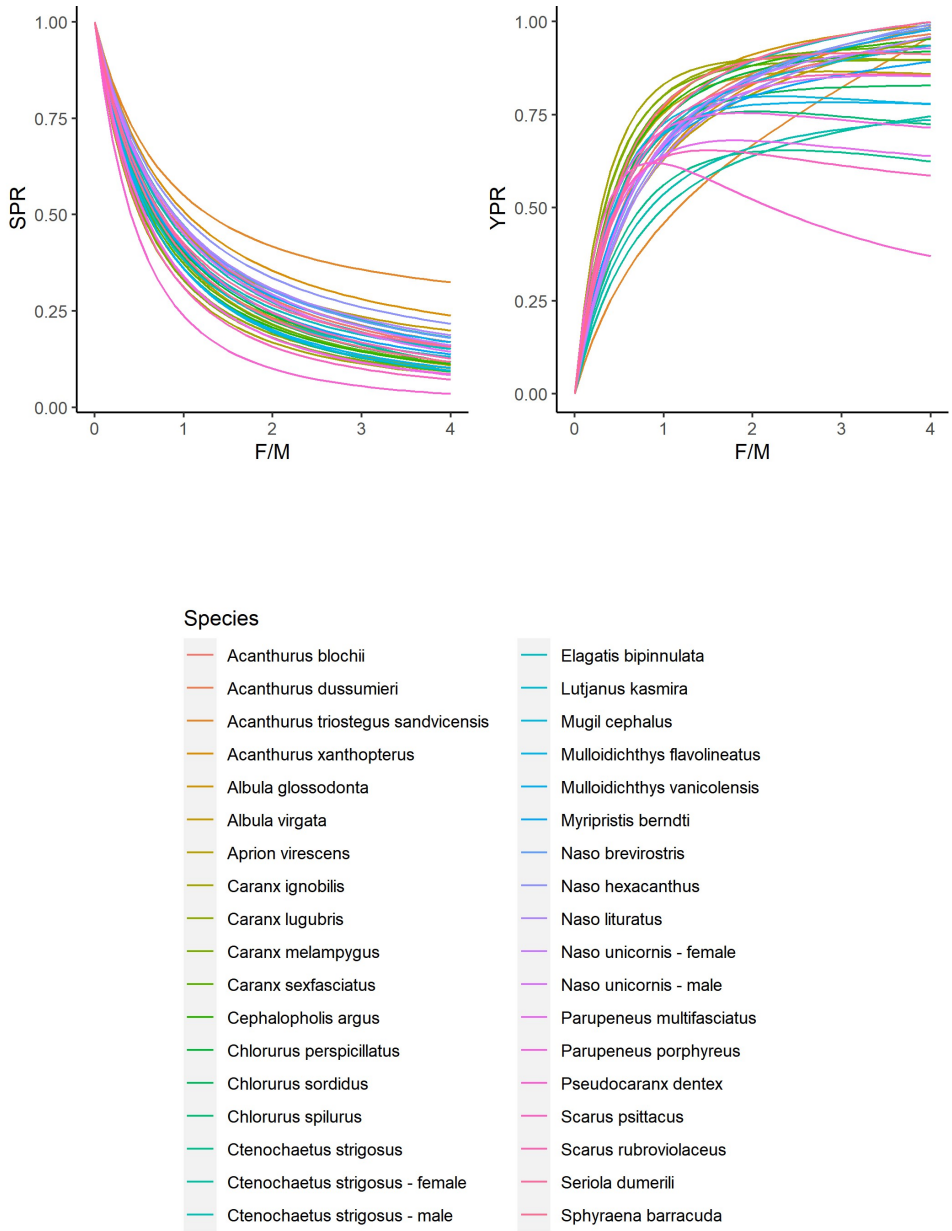


Figure 1. Reef-associated fishes included in minimum size limit analysis. Upper left panel is spawning potential ratio (SPR) plotted against fishing pressure (F/M). Upper right panel is relative yield (YPR) plotted against F/M.

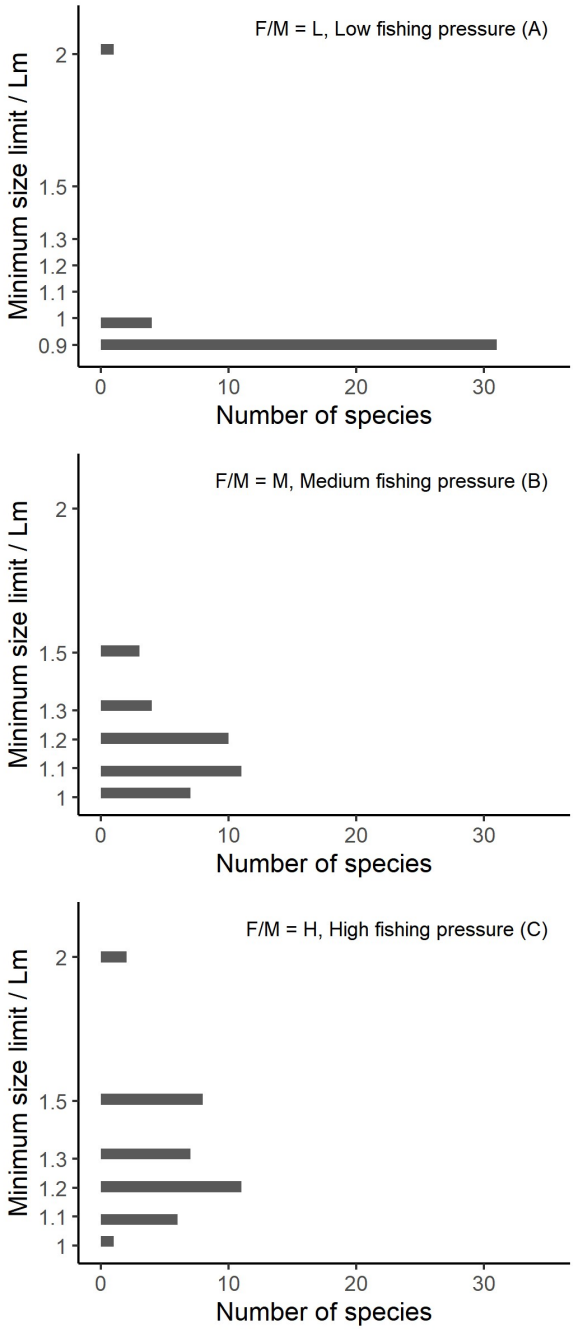


Figure 2. Minimum size limits (as multipliers of Lm) that achieve a sustainability reference point (i.e., spawning potential ratio of 30%) at (A) low, (B) medium, and (C) high fishing pressure.

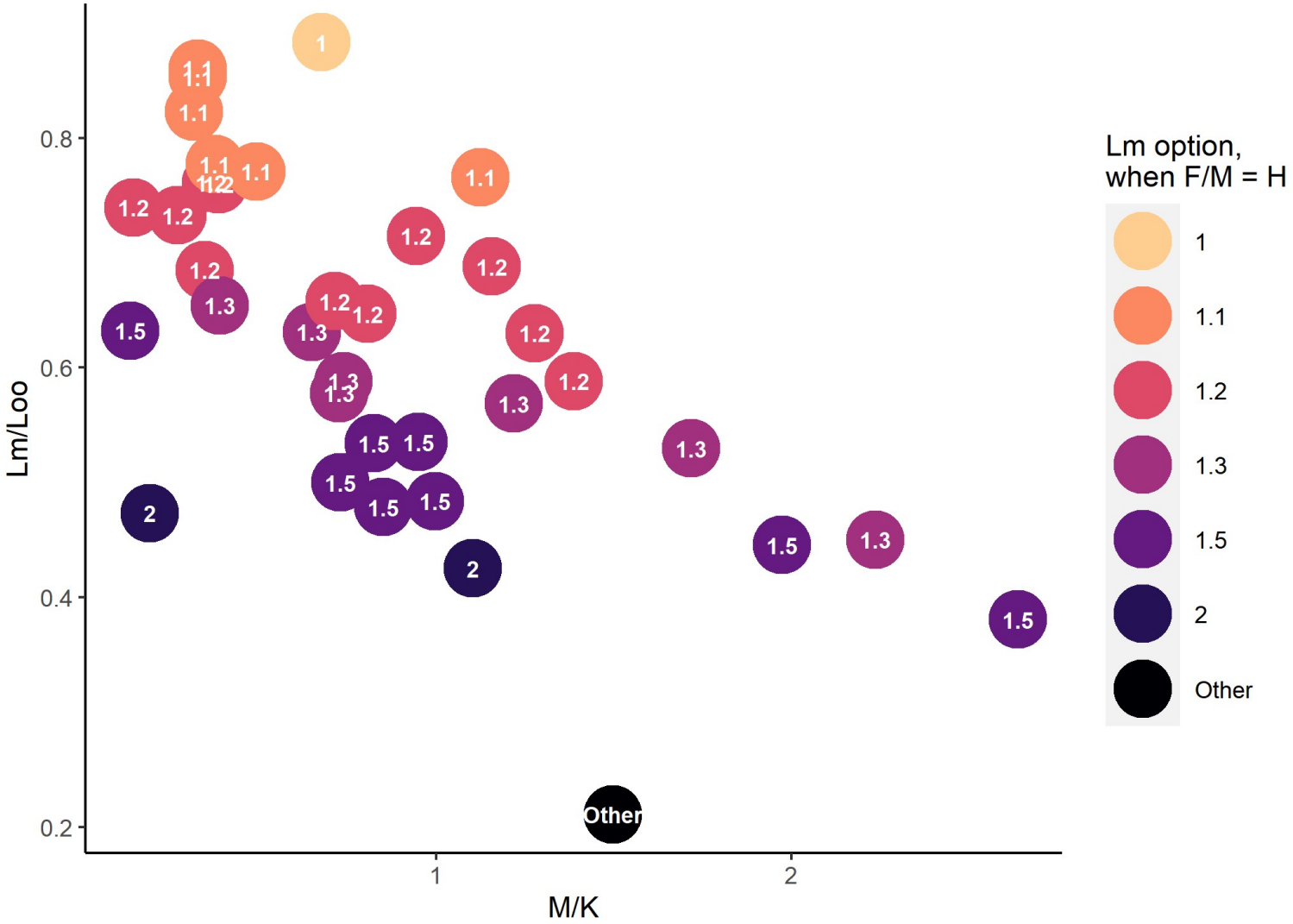


Figure 3. Minimum size limits (as multipliers of Lm) that achieve a sustainability reference point (i.e., spawning potential ratio of 30%) plotted against life history characteristics. Each point is one species that was included in the study. M/K is the ratio of natural mortality to the growth coefficient in the von Bertalanffy growth equation. Lm/Loo is the ratio of length at maturity to asymptotic length in the von Bertalanffy growth equation.

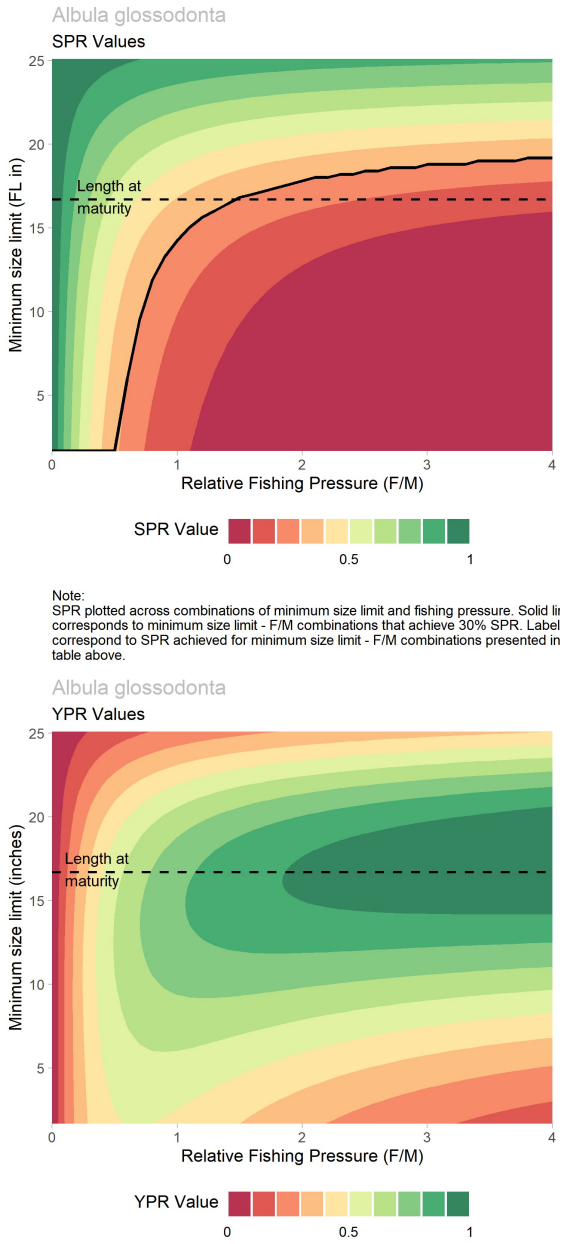


Figure 4. Example contour plots. Top: spawning potential ratio (SPR); bottom: relative yield (YPR).